EVALUATION OF FETAL OUTCOME BY USG COLOUR DOPPLER IN PATIENTS OF PIH WITH AND WITHOUT FETAL GROWTH RESTRICTION

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Abstract

Detection of fetal hypoxia with Doppler flow studies of Umbilical Artery (UA) & Middle Cerebral Artery (MCA), to reduce perinatal morbidity and mortality by timely intervention. Evaluation of foetal health in cases of severe PIH & IUGR by Doppler flow studies of UA and MCA flow velocimetry. Gestational age and mode of delivery, Evaluation of the perinatal outcome & Cut-off values of RI, PI and S/D ratio of UA and MCA to identify IUGR.

IUGR was higher in patients with PIH (76.6%) in comparison to the control group (50.0%). Only 76.7% patients with PIH had an apgar of > 7, while all control group patients had apgar of > 7. 28 (46.6%) neonates needed NICU support and 1 neonate expired, while 100% of control group neonates were shifted to mother.

In both control and study groups weight of IUGR babies was significantly lower in comparison to their non-IUGR counterparts (by USG and actual)

Keywords: Fetal, USG Color Doppler, PIH & Outcome.

Introduction

Pregnancy induced hypertension (PIH) – major cause of maternal and perinatal mortality and morbidity worldwide Cause of 24% of all maternal mortality in developed countries and 20% in developing countries.^[1] Early detection of PIH allows vigilant antenatal surveillance and appropriate intervention to avoid serious sequelae. Good utero-placental circulation is essential to achieve normal pregnancy FGR – complex multifactorial condition affecting 3-10% of all pregnancies FGR is associated with an increased risk of perinatal mortality, morbidity and impaired neurodevelopment Colour doppler so helps in detecting these abnormal vascular resistance patterns.^[2]

The important issue is not the identification of small fetus but rather the “fetus at-risk” for compromise and timely intervention. The challenge is to identify FGR from constitutional small fetus. Accurate diagnosis of FGR is essential for early detection and proper antenatal management reduces perinatal mortality and morbidity.^[3]

Umbilical and middle cerebral artery velocimetry is a good predictor of growth restricted fetus. The brain of a normally developed fetus has low vascular impedance with continuous flow throughout cardiac systole. Late onset of placental insufficiency is commonly associated with redistribution of blood flow in favour of fetal brain (i.e. brain sparing phenomena)^[4]

MATERIAL AND METHODS

Place of Study: Department of Obstetrics & Gynaecology, Index Medical College, Hospital & Research Centre, Indore (M.P.) from December 2017 to December 2018.

Inclusion Criteria

- Primigravida / multigravida with viable singleton pregnancy
- Woman with definite LMP with 3 previous regular menstrual cycles
- Uncomplicated pregnancy not associated with any high risk factor
- Gestational age corresponding to per abdomen findings
- Woman and/or her legally acceptable representative willing to provide voluntary written informed consent for participation

Exclusion Criteria

- Woman with multiple gestations
- Woman and/or her legally acceptable representative not willing to provide voluntary written informed consent for participation

Grouping

- Group S (N=60): Woman with PIH with/without IUGR

- Group C (N=40): Control Group (without PIH) with/without IUGR

Outcome Measures

- Fetal weight
- Apgar Score (1 min, 5 min)
- Admission to NICU
- Perinatal Morbidity
- Perinatal Outcome
- Doppler parameters – RI, PI and S/D Ratio for Umbilical Artery and Middle Cerebral Artery

Methodology

- Voluntary written informed consent obtained
- Woman underwent Doppler study using..... (Name of machine)
- Waveforms were analyzed for RI, PI and S/D ratio
- Any increased resistance, AEDF and/or REDF in uteroplacental blood flow were noted

Method of Data Collection

- Customized proforma designed for study purpose and observational method

RESULTS

Table 1: Age Distribution

Age	Control Group		Study Group	
	No.	%	No.	%
19-20 years	16	40.0	8	13.3
21-25 years	20	50.0	18	30.0
26-30 years	4	10.0	34	56.7
Total	40	100.0	60	100.0

Majority of women in age group 21-25 years in control group and 26-30 years in the study group

Table 2: Group Distribution

	Control Group		Study Group	
	No.	%	No.	%
28-30 weeks	4	10.0	2	3.3
30-32 weeks	0	0.0	2	3.3
32-34 weeks	12	30.0	10	16.7
34-36 weeks	12	30.0	24	40.0
36-38 weeks	8	20.0	2	3.3
Term	4	10.0	20	33.3
Total	40	100.0	60	100.0

In control group, majority of the women presented in 32-34 weeks (30.0%) & 34-36 weeks (30.0%); while in the study group majority of them presented in 34-36 (40.0%), followed by 33.3% term.

Table 3: Growth Restriction

Growth Restriction	Control Group		Study Group	
	No.	%	No.	%
IUGR	20	50.0	46	76.6
Non-IUGR	20	50.0	14	23.3
Total	40	100.0	60	100.0

76.6% IUGR in study group.

Table 4: Apgar score

Apgar at 5 min	Control Group		Study Group	
	No.	%	No.	%
< 7 at 5 min	0	0.0	14	23.3
>= 7 at 5 min	40	100.0	46	76.7
Total	40	100.0	60	100.0

Only 76.7% in the study group had apgar score ≥ 7 at 5 min.

Table 5: Fetal Outcome

Fetal Outcome	Control Group		Study Group	
	No.	%	No.	%
NICU	0	0.0	24	40.0
NICU – Death	0	0.0	2	3.3
NICU – Ventilator	0	0.0	2	3.3
Shifted to Mother	40	100.0	32	53.3
Total	40	100.0	60	100.0

76.6% IUGR in study group.

Discussion

Although Doppler studies of the ductus venous, middle cerebral artery, and other vessels have some prognostic value for IUGR fetuses, currently there is a lack of randomized trials showing benefit.^[5]

The UA PI can be used to identify IUGR per se, which is contrary to our study, where we found S/ D ratio of umbilical artery to be able to identify. Stolic/diastolic (S/D) ratio had sensitivity of 60%,^[6] while in our study the sensitivity was slightly higher (74%).

Doppler velocimetry of the uterine arteries reveals a progressive decrease in impedance with advancing gestational age. This decrease in impedance is thought to reflect a maternal adaptation to pregnancy resulting from trophoblastic invasion of the maternal spiral arterioles in the first half of gestation. The uterine artery can be demonstrated by color Doppler velocimetry as it originates from the anterior division of the hypogastric artery, and just before it enters the uterus at the uterine-cervical junction.^[7] Pulsed Doppler velocimetry of the uterine artery should be obtained immediately after the vessel crosses the hypogastric artery and before it divides into the uterine and cervical branches. The ability to obtain the

uterine artery Doppler waveforms at all gestational ages is approximately 95-98%.^[8]

Conclusion

IUGR was higher in patients with PIH (76.6%) in comparison to the control group (50.0%). Only 76.7% patients with PIH had an apgar of > 7 , while all control group patients had apgar of > 7 . 28 (46.6%) neonates needed NICU support and 1 neonate expired, while 100% of control group neonates were shifted to mother

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